CONFORMAL INVARIANCE OF ISING MODEL CORRELATIONS

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The two-dimensional Ising model is one of the most fundamental models in statistical mechanics. At the phase transition point, its scaling limit has been conjectured since the 1970s to be invariant under conformal mappings. Assuming this conjecture, physicists were able to predict spectacular formulae for the correlation functions of the Ising model fields. These formulae are now widely used and are considered one of the most emblematic successes of field theory.

In joint works with D. Chelkak, K. Izyurov and S. Smirnov, we have recently proven the conformal invariance of the Ising model fields, and the formulae predicted by physicists. Our proofs rely mainly on complex analytic and probabilistic techniques.

Keywords: Ising model, conformal invariance, scaling limit, phase transition, field theory

[1] C. Hongler, S. Smirnov. The energy density in the planar Ising model, *Acta Math.*, to appear. arXiv:1008.2645v3.

[2] D. Chelkak, C. Hongler, K. Izyurov. Conformal Invariance of Spin Correlations in the Planar Ising Model. arXiv:1202.2838v1.